

REMARKS

Reconsideration of the above-identified application in view of the foregoing amendments and following remarks is respectfully requested.

Claim Status

Claims 1-18 are pending in this application, all of which claims are rejected.

Claims 1 and 18 are independent in form. Claims 1-18 are rejected.

Objections to the Drawings

The Examiner has asserted that FIGS. 3-6 and 11-14 should be designated by a legend such as "Prior Art" because only that which is old is illustrated. FIGS. 3-6 and 11-14 are amended herein to add a legend of "Prior Art" to each figure. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the objections to the drawings.

Objections to the Specification

The Examiner noted that at page 16, line 4, "parallel EUV light" is assigned an incorrect reference number. The sentence beginning on page 16, line 4 is amended herein to correct the reference number.

The Examiner also noted that the term "projection optical system" is assigned two different reference numbers (i.e. 18 and 1008) with respect to different figures. The Examiner correctly notes that reference number 18 refers to the projection optical system that is depicted in FIG. 1, which is comprised of a plurality of unlabeled reflecting mirrors; and reference number 1008 refers to two reflecting mirrors that comprise an unlabeled conventional projection optical system. The Specification is amended here to remove the phrase "projection optical system 1008."

The Examiner further noted that “arc illumined area” and “arc slit opening” on page 23, lines 25-25 have the same reference number. The sentence beginning on page 23, line 22 is amended herein to correct the reference number for the “arc slit opening.”

The Examiner also noted that a “reflection mask 16” is described on page 25, line 9, but is not labeled in the drawings. The sentence beginning on page 23, line 6 is amended herein to remove reference number “16” from the sentence.

The Examiner further noted that the optical axis designated as “18X” on pages 26 and 27, lines 27 and 2, respectively, is not shown. The sentence beginning on page 26, line 26 is amended herein to remove recitations of reference number “18X” from the sentence.

Applicant has addressed each of the Examiner’s objections to the specification. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the objections to the specification.

Claim Rejections

Claims 1, 3, 11-14, and 16-18 are rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Terasawa, U.S. Patent No. 6,860,610 (“Terasawa”). Claims 4-10 and 15 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Terasawa in view of Tsuji, U.S. Patent Publication No. 2003/0031017 (“Tsuji”). Applicant respectfully disagrees with the characterization of the claims and prior art in the stated rejection and respectfully traverse these rejections.

The Examiner contends that Terasawa discloses an exposure apparatus for illuminating a pattern of a reflection mask using light from a light source, comprising, *inter alia*, an illumination optical system, which includes a field stop and “an imaging system for directing

the light from the opening in the field stop into the reflection mask, the imaging system being a coaxial optical system” at col. 2, line 43-44.

Putting the cited section in context, Terasawa discloses:

A reflection type projection optical system according one aspect of the present invention for projecting a pattern on an object surface onto an image surface and for serving as an imaging system that forms an intermediate image between the object surface and image surface includes four or more mirrors arranged substantially as a coaxial system to reflect light from an object side to an image side, and reflection surfaces on the four or more mirrors forming the same direction for forming a reflection angle.

Terasawa at col. 2, lines 38 – 46.

In this section, Terasawa discloses a reflection type projection optical system according to one embodiment, in which mirrors are arranged as a coaxial system to reflect light from an object side to an image side.

In addition, the Examiner contends that Terasawa further discloses “a projection optical system for projecting the pattern on the reflection mask onto a substrate, wherein a principal ray of the imaging system at a side of the reflection mask forming an inclination angle to a common axis of the coaxial optical system, the inclination angle being approximately equal to an angle between a principal ray of said projection optical system at the side of the reflection mask and a normal to a surface of the reflection mask” at col. 8, line 36 – col. 9, line 2 and in FIG. 1.

Putting the cited section in context, Terasawa discloses:

As described above, the inventive reflection type projection optical system 100 is a reflection type projection optical system that realizes a diffraction limited performance for the wavelength of EUV light without interference between the aperture stop and other reflected light, and includes no reflection surface near the aperture stop. In addition, a small inclination of the principal ray from the

object and a small reflection angle may reduce the aberration and obtain good imaging performance.

Terasawa at col. 8, line 25 – col. 9, line 2.

Referring now to FIG. 1 of Terasawa, it is clear that Terasawa merely disclose a *reflection type projection optical system* 100, in which mirrors are arranged as a coaxial system to reflect light from an object side to an image side. However, Terasawa is silent regarding an *illumination optical system* that includes “an imaging system for directing the light from the opening in the field stop into the reflection mask, the imaging system being a coaxial optical system” as recited by independent claim 1.

Terasawa discloses an illumination optical system 214, as follows:

The illumination optical system 214 propagates the EUV light, illuminates the reticle 220, and includes a condenser optical system, an optical integrator, an aperture stop, a blade, etc. For example, the condenser optical system includes one or more mirrors for condensing EUV light that is radiated approximately isotropically from the EUV light source 212, and the optical integrator uniformly illuminates the reticle 220 with a predetermined aperture.

Terasawa at col. 9, lines 53-60. However, Terasawa fails to disclose or suggest an illumination optical system that includes an imaging system that is a coaxial optical system. Further, Tsuji fails to disclose or suggest such an illumination optical system.

Thus, neither Terasawa nor Tsuji, alone or combination, disclose or suggest an “exposure apparatus comprising: an illumination optical system for illuminating a pattern of a reflection mask, by using light from a light source, wherein said illumination optical system includes: a field stop that defines an illuminated area on the reflection mask, and has an opening; and an imaging system for directing the light from the opening in the field stop into the reflection mask, the imaging system being a coaxial optical system; and a projection optical system for

projecting the pattern on the reflection mask onto a substrate, wherein a principal ray of the imaging system at a side of the reflection mask forming an inclination angle to a common axis of the coaxial optical system, the inclination angle being approximately equal to an angle between a principal ray of said projection optical system at the side of the reflection mask and a normal to a surface of the reflection mask” as required by independent claim 1. Independent claim 18 is believed to define patentable subject matter for similar reasons.

Applicant respectfully submits that the present invention as claimed is neither taught nor suggested by, and therefore is neither anticipated nor rendered obvious in view of, Terasawa or Tsuji, alone or in combination. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-18.

Dependent Claims

Applicant has not independently addressed the rejections of the dependent claims. Applicant submits that, in view of the arguments presented herein and, for at least similar reasons as to why the independent claims from which the dependent claims depend are believed allowable as discussed supra, the dependent claims are also allowable. Applicant however, reserves the right to address any individual rejections of the dependent claims should such be necessary or appropriate.

CONCLUSION

For the above-stated reasons, this application is respectfully asserted to be in condition for allowance. An early and favorable examination on the merits is requested. In the event that a telephone conference would facilitate the examination of this application in any way, the Examiner is invited to contact the undersigned at the number provided.

AUTHORIZATION

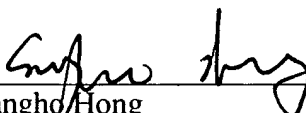
The Commissioner is hereby authorized to charge any additional fees which may be required for consideration of this Amendment to Deposit Account No. **13-4500**, Order No. 1232-5268.

In the event that an extension of time is required, or which may be required in addition to that requested in a petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account No. **13-4500**, Order No. 1232-5268.

Respectfully submitted,
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Dated: December 22, 2005

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Appendix A

Formal drawing replacement sheets for FIGS. 3-6 and 11-14.

AMENDMENTS TO THE DRAWINGS

FIGS. 3-6 and 11-14 have been amended to add a legend of "Prior Art." Formal drawing replacement sheets for FIGS. 3-6 and 11-14 are attached in Appendix A.